

In the Matter of)	
)	
Amendment of Part 2 of the)	
Commission's Rules to)	
)	ET Docket No. 00-258
Allocate Spectrum Below 3 GHz)	
for Advanced Services)	
)	
and)	
)	
Further Notice of Proposed Rulemaking)	
(FNPRM))	
Amendment of Part 2 of the)	
Commission's Rules to)	
)	ET Docket No. 01-224
Allocate Spectrum Below 3 GHz)	
for Mobile and Fixed Services)	
to Support the Introduction of)	
New Advanced Wireless Services)	

Recommendations of the DECT Forum
for
Revision of the Rules for the UPCS Band

The DECT Forum hereby files these recommendations in response to the Notice of Proposed Rulemaking (NPRM), ET Docket 00-258, and Further Notice of Proposed Rulemaking, ET docket 01-224¹. The DECT Forum appreciates this opportunity to provide the FCC with these recommendations for the revision of the rules governing the Unlicensed Personal Communications Services (UPCS) frequency band, contained in 47CFR15.323.

The DECT Forum is an international industry association embracing suppliers and operators of DECT based terminals, systems, and networks.² DECT stands for "Digital Enhanced Cordless Telecommunications" and denotes a radio technology suited for voice, data and networking applications with range requirements up to a few hundred meters. The DECT Forum represents the interests of the DECT industry.

In this ex parte filing the DECT Forum is making the following recommendations:

1. Remove fixed channelization requirements.
2. Add a maximum bandwidth limit, set at 2.5 MHz.
3. Extend the band for isochronous devices down to 1915 MHz.
4. Removal the packing rule, section 15.323 (b).

The changes being proposed are intended to increase the flexibility and utility of the UPCS band, maintaining the unique properties of the isochronous etiquette rules, which enable coexistence of high quality real time services in an unlicensed spectrum. A more detailed discussion of the reasons for these recommendations and the benefits they provide are given in the discussion below.

I. History and Current Considerations of the UPCS Band, 1910-1930 MHz

The Unlicensed Personal Communications Services (UPCS) frequency band, between 1910-1930 MHz, is allocated worldwide to the Fixed and Mobile Services. In the United States, the 1910-1920 MHz portion of the band has been used for asynchronous data UPCS devices, and the 1920-1930 MHz portion is used for isochronous voice UPCS devices, operating under Part 15 of the Commission's rules (unlicensed operations). The 2390-2400 MHz

¹ ET Docket 00-258 was followed by Memorandum Opinion and Order and Further Notice of Proposed Rulemaking (MO&O and FNPRM)ET Docket 01-224.

² Further information on the DECT Forum may be found at: www.dect.org.

band is allocated in International Telecommunication Union (ITU) Region 2 (the Americas) on a co-primary basis to the Fixed, Mobile, and Radiolocation Services, and on a secondary basis to the Amateur Service. In the United States, it is allocated on a primary basis to the Amateur Service; it is also designated for use by asynchronous data UPCS devices for operation under Part 15 of the Commission's rules. UTAM, Inc., the frequency coordinator for the UPCS bands, was required to relocate incumbent fixed operations before nomadic UPCS operation is permitted. UTAM has relocated over 95 percent of the incumbent fixed operators since the band was made available for other uses. All three bands are among those identified by either the 1992 World Administrative Radio Conference (WARC-92) or WRC-2000 for possible new advanced wireless services use.

However, there has been little development of unlicensed asynchronous devices in the 1910-1920 MHz and 2390-2400 MHz bands, and only limited wireless PBX use has begun in the 1920-1930 MHz segment. The underutilization by unlicensed devices of the 1910-1920 MHz and 2390-2400 MHz bands has prompted the filing of two petitions for rulemaking by requesting certain changes to these bands.

In its FNPRM, ET Docket 01-224 the Commission asked the following questions:

- Should some or all of the 1910-1930 MHz band should be reallocated for new advanced wireless services use or for incumbents displaced by advanced wireless services?
- To what extent is it being used or likely to be needed for UPCS or other permitted uses?
- How could it fit with other spectrum being considered for new advanced wireless services?
- How might it be used to provide spectrum for incumbents that need to be relocated to accommodate new advanced wireless services allocations?
- If part of this spectrum should be reallocated directly for new advanced wireless services or for relocation in support of new advanced wireless services, how much, and which parts?
- How would reallocation affect the UPCS service rules?
- Is the location of the 1910-1930 MHz bands in proximity to the PCS bands either a limitation on or a benefit to their possible use for new advanced wireless services?

- In view of the expenses incurred by UPCS for relocating the fixed microwave facilities in the 1910-1930 MHz bands, how might these expenses be redistributed, if these bands could be used for new advanced wireless services?
- Could existing UPCS operations continue in this band, or would they have to cease?

The view of the DECT Forum to the above set of questions is that the isochronous services of the UPCS sub-band are needed and should be given improved conditions to be further developed. The UPCS isochronous etiquette rules provide unique properties, which enable reliable coexistence of high quality real time services like speech in an unlicensed spectrum. In this sense the isochronous sub-band provides a kind of “protected” spectrum or service, which is wanted and sometimes required for residential and enterprise applications. Such “protection” is not provided e.g. by the more general rules for deployment of communication equipments in the popular the ISM bands. Therefore there is a legitimate goal to keep and increase the utilization of the isochronous UPCS band. The data services intended for the asynchronous UPCS sub-band have in reality used the larger ISM bands (2.4 and 5 GHz). Thus at least part of the asynchronous UPCS sub-band 1910 – 1920 MHz should be reassigned to become part of the isochronous sub-band. We also recognize the interest to use part of the asynchronous sub-band for PCS (the new G-band). UPCS fits the needs to create a proper guard band between the PCS base station and mobile station transmit bands. It would be dangerous for the PCS services to decrease this guard band below 15 MHz. Therefore it is proposed to extend the isochronous UPCS sub-band (at least) down to 1915 MHz. The UPCS rule changes proposed below will greatly increase the efficient utilization of the isochronous UPCS band. These proposed rules do not increase interference levels to the adjacent PCS services, rather decrease them by removing the packing rule, see Section V below.

II. Remove fixed channelization requirements

The fixed 1.25 MHz channelization defined in section 15.323 (a) is not needed, but causes inefficient use of the UPCS spectrum by limiting the freedom to optimize carrier positions for the different technologies. This fixed channelization should be replaced with a maximum bandwidth limit (see Section III below) to provide for more flexible carrier positions and higher symbol rates. Deleting the 1.25 MHz channels requires changes also in sections 15.323 (c)(5), (c)(11) and (d), because the fixed channels are used when defining these requirements. Suggested wording for revision of these requirements without using the fixed channel concept is provided in an annex to this ex parte presentation.

III. Add a maximum bandwidth limit, set at 2.5 MHz

A consequence of removing the fixed channelization (see section I above) is that the implied bandwidth limit of 1.25 MHz is also removed. The fixed channelization did indirectly impose an upper bandwidth of 1.25 MHz. When removing the fixed channelization, there is a need to complement the rules an upper bandwidth limit. Note that the asynchronous rules (1910-1920 MHz) had an upper bandwidth of 10 MHz. Further, the isochronous UPCS rules provide for efficient coexistence not only in the frequency domain, but also in the time domain. Thus a maximum bandwidth limit of 2.5 MHz provides a reasonable value to support technological development and is proposed here. This limit will accommodate present candidate technologies as well as future applications with higher symbol rate, and will thus secure efficient future use of the UPCS band.

IV. Extend the band for isochronous devices from down to 1915 MHz.

The proposal to extend the isochronous UPCS band down to 1915 MHz is based on proposals from the PCS industry to create a new G-block taking the band 1910 – 1915 MHz from the UPCS spectrum. The DECT Forum proposed that the remainder of the asynchronous

portion of the spectrum, from 1915-1920 MHz be allocated to isochronous use. UPCS fits the needs to create a proper guard band between the PCS base station and mobile station transmit bands. It would be dangerous for the PCS services to decrease this guard band below 15 MHz, since PCS equipment has been designed and infrastructure planned for a 20 MHz guard band. Existing PCS equipment specifications assume a 20 MHz guard-band. If a much smaller guard band, than the 15 MHz proposed here, is used the cost of equipment will increase and existing equipment will not have the required and expected isolation between the Base station transmit band and Mobile station transmit band.

The immense popularity and utility of unlicensed spectrum is well known to the commission. New types of equipment and services are continually being developed and provide great benefit to the economy and the public at large. The UPCS isochronous etiquette rules provide unique properties, which enable reliable coexistence of high quality real time services like speech in an unlicensed spectrum. In this sense the isochronous sub-band provides a kind of “protected” spectrum or service, which is wanted and sometimes required for residential and enterprise applications. Such “protection” is not provided e.g. by the more general rules for deployment of communication equipments in the popular the ISM bands. Therefore there is a legitimate goal to keep and increase the utilization of the isochronous UPCS band. In particular isochronous, voice services, continue to increase in demand. Providing an additional 5 MHz of spectrum to this class of service will be of great benefit in providing new products and services to meet this demand.

V. Removal of the packing rule, section 15.323 (b)

It is also recommended that the rule 15.323 (b), that a device must start its channel search at the edge of the band, be changed. This requirement causes more problems than it solves. It causes all transmission in the UPCS band to pack the carriers close to the UPCS band edges. That means packing as close as possible to the PCS band edges. This increases the probability of

interference to PCS devices operating in the PCS channels adjacent to the UPCS band . It is therefore recommended that this requirement be eliminated.

VI. Summary

The isochronous services of the UPCS sub-band are needed and should be given improved conditions to be further exploited. The UPCS isochronous etiquette rules provide unique properties, which enable reliable coexistence of high quality real time services like speech in an unlicensed spectrum. In this sense the isochronous sub-band provides a kind of “protected” spectrum or service, which is wanted and sometimes required for residential and enterprise applications. There is thus a legitimate goal to keep and increase the utilization of the isochronous UPCS band. The proposed changes of the UPCS rules will greatly increase the efficient utilization of the isochronous UPCS band.

These proposed rules do not increase interference levels to the adjacent PCS services, rather decrease them by removing the packing rule 15.323 (b).

The amended UPCS rules will accommodate present candidate technologies as well as future applications with higher symbol rate, and will thus secure efficient future use of the UPCS band.

Respectfully submitted,

DECT Forum

October 31, 2003

for the DECT Forum

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Siemens

Annex: Proposed Wording Changes to FCC Part 15

DECT Forum proposal increased flexibility and utility of the UPCS Band

Code of Federal Regulations

Title 47, Volume 1

Revised as of October 1, 2001

From the U.S. Government Printing Office via GPO Access

CITE: 47CFR15.323

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TITLE 47--TELECOMMUNICATION

CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION

PART 15--RADIO FREQUENCY DEVICES--Table of Contents

Subpart D--Unlicensed Personal Communications Service Devices

Sec. 15.323 Specific requirements for isochronous devices operating in the ~~1920~~1915-1930 MHz sub-band.

- (a) Operation shall be contained within ~~one of eight 1.25 MHz channels starting with 1920-1921.25 MHz and ending with 1928.75-1930 MHz. Further sub-division of a 1.25 MHz channel is permitted with a reduced~~the 1915-1930 MHz band. The emission bandwidth shall be less than 2.5 MHz. The power level, shall be as specified in Sec. 15.319(c), but in no event shall the emission bandwidth be less than 50 kHz.
- (b) ~~Intentional radiators with an intended emission bandwidth less than 625 kHz shall start searching for an available time and spectrum window within 3 Mhz of the sub-band edge at 1920 MHz and search upward from that point. Devices with an intended emission bandwidth greater than 625 kHz shall start searching for an available time and spectrum window within 3 Mhz of the sub-band edge at 1930 MHz and search downward from that point.~~
- (c) Isochronous devices must incorporate a mechanism for monitoring the time and spectrum windows that its transmission is intended to occupy. The following criteria must be met
 - (1) Immediately prior to initiating transmission, devices must monitor the combined time and spectrum windows in which they intend to transmit for a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period.

- (2) The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.
- (3) If no signal above the threshold level is detected, transmission may commence and continue with the same emission bandwidth in the monitored time and spectrum windows without further monitoring. However, occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.
- (4) Once access to specific combined time and spectrum windows is obtained an acknowledgment from a system participant must be received by the initiating transmitter within one second or transmission must cease. Periodic acknowledgments must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgment, at which time the access criteria must be repeated.
- (5) If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed. A device utilizing the provisions of this paragraph must have monitored all access channels defined for its system within the last 10 seconds and must verify, within the 20 milliseconds (40 milliseconds for devices designed to use a 20 milliseconds frame period) immediately preceding actual channel access that the detected power of the selected time and spectrum windows is no higher than the previously detected value. The power measurement resolution for this comparison must be accurate to within 6 dB. No device or group of cooperating devices located within 1 meter of each other shall during any frame period occupy more than three 1.256 MHz channels during any frame period of aggregate bandwidth, or alternatively, more than one third of the time and spectrum windows defined by the system. [Since we have removed section (b, also the following sentence has to be removed!)] ~~Devices in an operational state that are utilizing the provisions of this section are not required to use the search provisions of paragraph (b) of this section.~~
- (6) If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same windows after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

- (7) The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds. If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds but shall not be required to be less than 35 microseconds.
- (8) The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.
- (9) Devices that have a power output lower than the maximum permitted under this subpart may increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted.
- (10) An initiating device may attempt to establish a duplex connection by monitoring both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.
- (11) An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within ~~the~~ 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.
- (12) The provisions of (c)(10) or (c)(11) of this section shall not be used to extend the range of spectrum occupied over space or time for the purpose of denying fair access to spectrum to other devices.
- (d) Emissions outside the sub-band shall be attenuated below a reference power of 112 milliwatts as follows: 30 dB between the ~~channel-sub-band~~ edges and 1.25 MHz above or below the ~~channel~~sub-band; 50 dB between 1.25 and 2.5 MHz above or below

the ~~channel~~sub-band; and 60 dB at 2.5 MHz or greater above or below the ~~channel~~sub-band. ~~Systems that further sub-divide a 1.25 MHz channel into X sub-channels~~Emissions inside the sub-band must comply with the following emission mask: In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device; in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator; in the bands between 3B and the ~~1.25 MHz channel~~sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator. ``B'' is defined as the emission bandwidth of the device in hertz. Compliance with the emission limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

- (e) The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these sub-bands shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.
- (f) The frequency stability of the carrier frequency of the radiator shall be maintained within <plus-minus>10 ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20 deg. to +50 deg.C at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20 deg.C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

Annex: Members of the DECT Forum

The following companies are the current members of the DECT Forum:

Ascom Tateco	Binatone Electronics Int.
ComLab	Doro
Dosch & Amand Systems	Ericsson Enterprise
Goodwin	Inventel
KIRK Telecom	LAKE Communications
OTE	Pace Micro Technology
Panasonic Communications Company	Philips Business Communications
RTX Telecom	Silicon & Software Systems
Siemens	Suncorp Communications
Swissvoice	Tenovis
Topcom	